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**STRATEGY PLANNING FORMULATION FOR AGROINDUSTRY  
BASED ON CASSAVA TO ANTICIPATE CLIMATE CHANGE  
(SWOT ANALYSIS AND BALANCE SCORECARD APPROACH)**KUSNANDAR<sup>1\*</sup>, WIWIT RAHAYU<sup>1</sup>, NUNING SETYOWATI<sup>1</sup>,  
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Surakarta, Central Java, Indonesia***ABSTRACT**

Agroindustry based on cassava development is expected to have a strategic role in reducing problems in food security as well as to play a role in the process of agroindustrialization and development of the region. This study aims to formulate development strategies for agroindustry based on cassava and identify key indicators in the development of agroindustry based on cassava. This study uses the exploratory research and took sites in Central Java, Indonesia. The data used are strengths, weaknesses, opportunities and threats as well as a key indicator in the development of agroindustry based on cassava includes financial, market, internal process and grow and learning perspective. For data analysis used the SWOT analysis and Balanced Scorecard. This research resulted that development strategies alternatives of agroindustry based on cassava including products development to obtain added value, the market penetration through market education cassava-base products, Increased of productivity and business efficiency and institutional and business networking development. While key indicators of cassava-based agroindustries development are as follows: Financial perspective covering cost structure efficiency and increased sales. In the customer perspective at competitive prices will increase sales and return, while the increase in market share will increase returns. In the internal process, institutional effectiveness will guarantee the price to be competitive and a large market share will guarantee a return. Empowerment, training, and workshops is a power driver on internal processes. Empowerment will encourage institutional effectiveness, product innovation and employing good quality, while workshops and training will ensure good employing and good quality.

**Keywords:** cassava, agroindustry, development strategies, SWOT, balance scorecard

**1 INTRODUCTION**

Dependence of food commodities consumed by people in other countries is one of the food security threats and sovereignty of the country. Dependence on wheat commodities is one of the concrete examples of threats that must be faced in efforts to achieve food security for the nation of Indonesia. Consumption of wheat flour from year to year is increase with the growth in the range of 20% (National Social Economic Survey 2013).

Cassava is a local commodity that has enormous potential but hasn't grown as the support of food security. Cassava is a plant that is tolerant to drought, have potential in the supply of calorie consumption, adaptable environments agroecology, can grow on soils with low

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fertility levels, resistant to climatic variations and is a source of starch which is good (CYE Consult 2009), has a long shelf life (Amanu 2014).

The climate is one key element in the system of metabolism and physiology of plants, the global climate change has a bad impact on the sustainability of agricultural development. Cassava is a commodity that is resistant to the negative effects of climate change, therefore agroindustry based on cassava development is one of the strategic efforts in the face of the negative impacts of climate change. Although cassava is a crop that is resistant to climate change, but climate change still impact on the production of cassava. The impact of climate anomalies that occurred during 1968-2000 showed that El Nino causes a decrease in cassava production amounted to 182.3 thousand tons (Irawan 2006). This, in turn, affects the agroindustry based on cassava. The Study of Medika (2016) shows that there is a significant difference in the amount of production, costs and acceptance of agroindustry based on cassava between normal season and when the El Nino.

Research development of cassava have been done mainly related to technical aspects of cultivation and processing techniques result (Susilowati et al. 2008; Ardian and Yuliadi 2009; Rosulu et al. 2012; Darmawan et al. 2013; Herlina and Nuraeni 2014; Irzam et al. 2014), but on the other hand research on cassava development strategy has not been done. Several studies of the development strategy of agricultural commodities including cassava generally using SWOT analysis which resulted in the formulation of generic strategies (Kusnandar et al. 2010). Based on the above description, this study will use a systems approach using a variety of analysis tools to be able to produce more concrete strategies and operational.

Agro-industry can play a role in the overall process of industrialization and economic development, however agro industry also has both positive and negative impacts. Starting from these two agroindustrialization process should be followed by a clear pathway guided by the policies and strategies that enough (Henson and Cranfield 2009). Agroindustry based on cassava development is expected to have a strategic role in reducing dependence on wheat also can play a role in the process of agroindustrialization and development of the region. This study aims to formulate a development strategy for agroindustry based on cassava and to identify key indicators in the development of agroindustry based on cassava through four perspective balanced scorecard.

## **2 RESEARCH METHOD**

This study was conducted to explore strategy behavior of agroindustry based on cassava. The systems approach is used to look at the problem comprehensively to unified system development.

This research was conducted in the Central Java Province. The research location determined purposively from 35 districts / municipalities in Central Java were selected purposively District / Town with highest cassava production shown by Table 1.

**Table 1. Harvested Area, Production and Productivity of Cassava by Regency/City in Central Java in 2013**

No	District	Harvested Area (ha)	Production (ton)	Productivity (kw/ha)
1.	Wonogiri District	56,803	1,062,144	186.99
2.	Pati District	16,163	698,325	432.05
3.	Jepara District	10,151	320,202	315.44
4.	Banjarnegara District	8,928	244,979	274.39
5.	Wonosobo District	6,182	195,754	316.65

Source: BPS Central Java province in Figures, 2014.

Table 1 shows that the Wonogiri and Pati regency are the two highest producers of cassava in Central Java province. Based on these considerations set Wonogiri and Pati as a research location.

### 2.1 Data and Data Collection Techniques

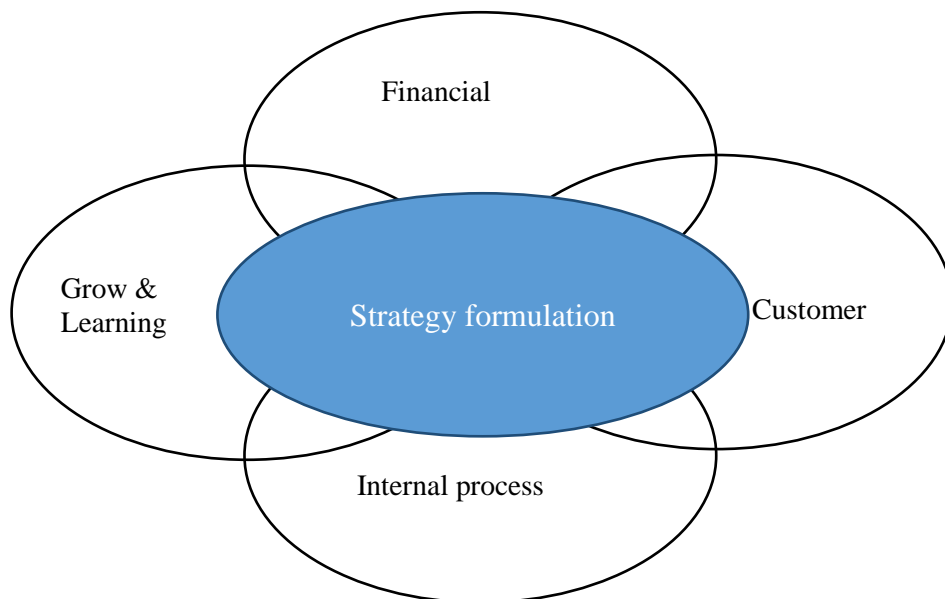
This study uses primary data include strengths, weaknesses, opportunities and threats in the development of cassava-based Agroindustry. It also used the data perspective indicator includes four perspectives: financial, internal processes, marketing, development, and training. Data were collected by using quota sampling with the number of survey respondents as many as 115 people. Data collected through surveys and focus group discussion.

### 2.2 Data Analysis Method

To formulate the development strategy of agroindustry based on cassava used SWOT analysis (Strength Weakness Opportunity and Threats), and to identify key indicators in the development of agroindustry based on cassava used the Balanced Scorecard analysis.

## 3 RESULT AND DISCUSSION

Strategic planning for agroindustry based on cassava formulated using SWOT analysis and balance score card. The SWOT analysis is used to identify strategic factors both internal (Strength and Weakness) and external (Opportunity and Threat). SWOT matrix used to formulate development strategies cassava-base Agroindustry and then BSC is used to translate the strategy into four perspectives are financial, customer, internal process and learning and growth. Schematically shown in figure 1.



**Figure 1. Strategic Planning for Cassava-Base Agroindustry Process**

### **3.1 Environmental Scanning for Development of Agroindustry Based on Cassava**

The first stage to formulate development strategies for agroindustry based on cassava is to analyze the strength, weakness, opportunity and threat factors are determine the development of agroindustry. These factors are used to formulate the strategy. The results of the analysis of strengths, weaknesses, opportunities, threats are as follows:

#### **3.1.1 Strength factors:**

##### ***3.1.1.1 Raw material prices lower***

Cassava is a food that regarded as inferior by society compared with other food ingredients. Therefore the price is cheap. In producer prices during the harvest season can be up to USD 500.00 / kg.

##### ***3.1.1.2 Availability of adequate raw materials***

Cassava is a plant can be grown in fertile regions and less fertile land included in the drylands. In the area of research where cassava is a crop, production is abundant. Pati Regency and Wonogiri are the largest cassava producing areas in Central Java Province. Therefore, the availability of raw materials for agro-industry is based on cassava.

##### ***3.1.1.3 The potential for high added value***

Cassava is a foods that can be used to make a variety of derivative products both are food and non-food products. Cassava can be consumed directly but can also be processed into various products. Food product made from cassava are chips, cassava, tapioca starch, mocaf, and so forth. One non-food products made from cassava is bioethanol. Processed cassava products have a high added value.

#### ***3.1.1.4 Cheap labor***

Processing of cassava into various derivative products do not require any special skills that require formal education. Therefore the cost of labor to cultivate cassava on cassava-based agro-industries be cheap.

#### ***3.1.1.5 Potency of raw material is large***

Cassava-based agro-industrial raw materials are very abundant. Cassava is available in most areas in Central Java. Cassava is a crop that is cultivated by the people because it can grow in a wide range of soil conditions, dry soil. Cultivation also not require intensive maintenance so that the cost is cheap and does not need high skills to cultivation. Therefore, the potential of raw materials is very large.

### **3.1.2 Weakness factors:**

#### ***Technology is still modes***

Cassava processing into various products is still using simple technology. This resulted in a limited number of products and the quality is not good enough.

#### ***3.1.2.1 Product development is still lacking***

Cassava processing into refined products is generally limited to products that are used in the community. Innovation and new product development have not been done. Product development efforts generally occur when there is an initiative of the government. Consequently when the government program is not there, stop product development efforts

#### ***3.1.2.2 Productivity remains low***

Cassava processing into refined products is generally limited to products that are used in the community. Innovation and new product development have not been done. Product development efforts generally occur when there is an initiative of the government. Consequently when the government program is not there, stop product development efforts.

#### ***3.1.2.3 The packaging technology is still lacking***

Cassava-based agro-products are generally packaged in a simple. Packaging technology is also simple. Most of the product packaging process is done manually by human labor. Packaging design is simple and less attractive.

#### ***3.1.2.4 Product quality is still lacking***

The product quality of agroindustry based on cassava in the research area is still not good. It can be seen from the lack of uniformity of products or their perishable products. The impact of this condition is the product often can't meet the quality standards desired by consumers.

### **3.1.3 Opportunity factors:**

#### ***3.1.3.1 The market demand is still high***

The market of agro-products based cassava are very spacious and open wide open. Dairy products are very diverse. The resulting food products needed by the public both as a staple food or snacks. Besides cassava-based processed by agroindustries products there is also a raw material for further processing industry. Therefore, consumers are not only direct consumers but also industry.

#### ***3.1.3.2 Availability of information technology as a means of marketing***

Developments in information technology at the moment is very rapid. This is an opportunity to know the market better than the number and type of consumer, consumer tastes and price of the product. Technological developments also gives opportunities to market products directly to consumers so great advantage. Besides the development of information technology can also reach a very wide area of marketing.

#### ***3.1.3.3 Increased demand for functional food products***

Cassava is a food that is believed to have certain health benefits. Along with the return of the community to take advantage of natural products in the health, the chances of developing the processed cassava products is very large.

#### ***3.1.3.4 Business climate support***

Cassava processing agro-industry likely to be developed. This is due to government's efforts to diversify the staple food of rice to other food sources of carbohydrate that one of them is cassava. Many government programs aimed at the development of agro-industry based on cassava. The program is conducted in the form of education and training to create a variety of refined products, capital, and technology assistance.

#### ***3.1.3.5 Availability of infrastructure***

Facilities and infrastructure are key prerequisites for business development. In order to develop agroindustry based on cassava provided a variety of means by which to develop the business. The existence of a government program to develop local food encourages the government to provide the infrastructure for the development of agro-industry based on cassava. Means provided include assistance in the form of means of production.

### **3.1.4 Threats factors:**

#### ***3.1.4.1 Climate change is uncertain***

Cassava is actually a plant that can be grown in different soil and weather conditions. However, rainfall is erratic, especially at harvest time caused a lot of cassava products damaged by decay if not immediately treated. Some processed cassava products also need sunlight in a process of manufacture. Therefore, if the weather is uncertain also inhibits the production process.

#### ***3.1.4.2 The availability of alternative products from abroad***

One threat to the cassava-based industry is the presence of processed cassava products from abroad. In general, processed cassava products from abroad are of better quality and cheaper price. It can result in cassava-based agro-industries are largely domestic-scale and simple technology was not competitive in the market.

#### ***3.1.4.3 Fluctuations in the price of the product***

Market competition, national or international economic turmoil fluctuation effect on the price of raw materials and processed products of cassava. These price fluctuations have an impact on production costs and the benefits obtained by the agro-industry. If prices continue to fluctuate causing cassava-based agro-industrial production is not stable.

#### ***3.1.4.4 The level of competition from substitute products are high***

Products processed cassava is a food that has a lot of competitors. Various processed eat rapidly evolving into a potential competitor. Product substitutions, not only variety and quality but also better. If competition from substitute products can't be anticipated, then this will threaten the sustainability of agro-industry based on cassava.

#### ***3.1.4.5 Public perception of cassava products is still inferior***

Another threat of agroindustry based on cassavadevelopment is the public perception that cassava is inferior food. As a result, when people's income increases then processed cassava products will be abandoned and their customers switch to other products that are considered more prestige. This would threaten the market of processed cassava products.

### **3.2 Strategy Formulation for Agroindustry Based on Cassava Development**

The second stage of the strategic planning process is to perform the formulation of strategies based on the strengths, weaknesses, opportunities and threats from the analysis of internal and external environment. SWOT matrix used to formulate strategies of agroindustry based on cassava development. The results of a strategy based on SWOT matrix formulation shown in Table 2.

**Table 2. Development Strategy Formulation for Agroindustry Based on Cassava**

<p><b>External</b></p>	<p><b>Opportunity</b></p> <ol style="list-style-type: none"> <li>1. The market demand is still high</li> <li>2. Availability of information technology as a means of marketing</li> <li>3. Increased demand for functional food products</li> <li>4. Business climate support</li> <li>5. Availability of infrastructure</li> </ol>	<p><b>Threat</b></p> <ol style="list-style-type: none"> <li>1. Climate change is uncertain</li> <li>2. The availability of alternative products from abroad</li> <li>3. Fluctuations in the price of the product</li> <li>4. The level of competition from substitute products are high</li> <li>5. Public perception of cassava products is still inferior</li> </ol>
<p><b>Internal</b></p> <p><b>Strength</b></p> <ol style="list-style-type: none"> <li>1. Lower price of cassava</li> <li>2. Availability of adequate raw materials</li> <li>3. Potential for high added value</li> <li>4. Cheap labor</li> <li>5. High quality of cassava</li> <li>6. Cassava grows easy terms</li> </ol>	<ul style="list-style-type: none"> <li>• Quality maintain and increase the productivity of cassava to meet the high market demand (S2, S5, S6, O1, O3)</li> <li>• Products development to obtain added value (S1, S2, S3, S4, S5, O1, O3, O4)</li> </ul>	<ul style="list-style-type: none"> <li>• The market penetration through market education about cassava-base products (SS2, S5, T2, T4, T5)</li> </ul>
<p><b>Weakness</b></p> <ol style="list-style-type: none"> <li>1. Technology is still modest</li> <li>2. Product development is still lacking</li> <li>3. Productivity remains low</li> <li>4. The packaging technology is still lacking</li> <li>5. Product quality is still lacking</li> </ol>	<p>Increasing productivity and cassava-based business efficiency (W1, W3, S4, S5, O1, O3)</p>	<p>Institutional and business networking development (W1, W2, W5, T2, T4)</p>

As for the alternative development strategy for agroindustry based on cassava in detail as follows:

### 3.2.1 Quality maintain and increase the productivity of cassava to fulfill the high market demand

Demand high cassava particular segment of the industry became a big attraction. The improvement of cassava quality and productivity will increase the demand of cassava. All this time, cassava cultivation is done individually with cultivation techniques vary from one farmer to another. It is necessary for the standardization of the quality of cassava that uptake of cassava market higher. Moreover, cassava is generally harvested in July-September, while demand for cassava throughout the year. Therefore, management is required cassava planting patterns precise and more strategic distribution patterns to be available in a longer time on the market

### 3.2.2 Products development to obtain added value

Cassava is a commodity that has a lot of potential as a raw material for various processed products, especially food including chips, cassava, “Tiwul instant”, tapioca flour, mocaf and others. Product development is an effort that can be done to increase the added value of commodity cassava. Product development can be done through the diversification of cassava processing such as one of the ingredients analog rice, instant noodles and the other.



Besides the product development can be done through packaging innovation to improve the image of the product and market penetration strategy. With the innovation of the idea, supported by the availability of cassava, raw material prices and labor costs are affordable may encourage the creation of a variety of processed products made from cassava. On the other hand, the public request for food alternative potential market opportunities for cassava processing.

### **3.2.3 The market penetration through market education about cassava-base products**

Cassava is known as a commodity that is inferior to most people. Lack of creativity and product innovation to make products of cassava processing has not attracted many people. In addition, the quality still varies, the less attractive packaging also constrain the marketing of products processed cassava. Though cassava is one potential alternative foodstuffs for both the economy as a reasonable price and have a high potential for product creation. To that end, efforts are needed to promote the diverse potential of cassava-based products to the public. Promotion can be done to deliver more value than cassava

### **3.2.4 Increasing productivity and cassava based business efficiency**

The effort made from cassava agro-industry is still constrained by the low productivity. This is due to the use of technology that is still largely manual so that the production capacity can't be optimal and production efficiency has not been reached. Raw material cassava agro-industry is dominated by SMEs scale. Medium and large-scale agro-industry is only a small part. Lack of capital, skills and technology led many Agroindustry made from cassava has not been able to improve productivity and business efficiency. Considering the market potential is still very open necessary technological innovations both in the production process and marketing innovations are more viable and attractive to consumers.

### **3.2.5 Institutional and business networking development**

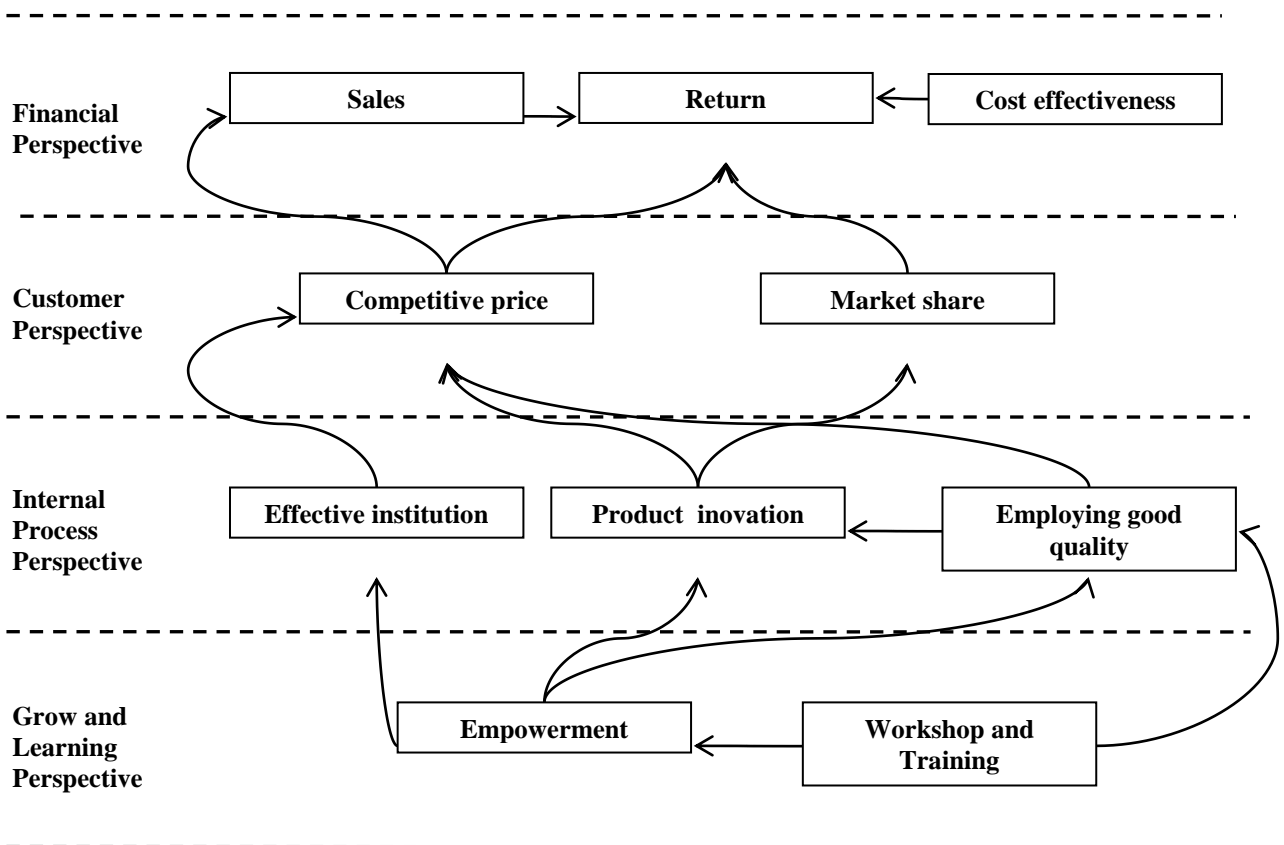
Agroindustry based on cassava requires strong institutional role both are the upstream or downstream. The role of government in facilitating the marketing of refined products, especially cassava flour and mocaf is necessary to protect the perpetrators of the agro-industry so get a decent price and is able to penetrate a wider market.

## **3.3 Translate Strategy into Four Perspectives of Balance Scorecard**

The third phase of development strategy planning for agroindustry based on cassava is to translate strategy into four perspectives of balance scorecard. Four important aspects include the perspective of financial, customer, internal business processes and learning and growth. The causality of the development strategy for agroindustry based on cassava is a link between financial and non financial factors that determine the performance of the

agroindustry. The main purpose of this phase is to identify the best indicators to communicate the meaning of an agroindustry development strategy through the four perspective. Based on the strategy that has been formulated that includes: products development to obtain added value; the market penetration through market education cassava-based products; increased productivity and business efficiency; institutional and business networking development, so the objectives to be achieved in development of agroindustry based on cassava for the financial perspective is to increase return

Increased return can be achieved through an efficient cost structure and increased sales. In the perspective of the customer at competitive prices will increase sales and return, while the increase in market share will increase returns. In the internal process, institutional effectiveness will guarantee the price to be competitive and a large market share will guarantee a return. Empowerment, training, and workshops is a power driver on internal processed. Empowerment will encourage institutional effectiveness, product innovation and employing good quality, while workshops and training will ensure good employing good quality. More clearly, development strategy map for agroindustry based on cassava can be seen in Figure 3.



**Figure 2. Development Strategy Map for Agroindustry Based on Cassava**

## 4 CONCLUSION

Climate change is an external factor (threat) that must be anticipated in the development of agroindustry based on cassava.

The strategies for agroindustry based on cassava include: products development to obtain added value; the market penetration through market education cassava-based products; increased productivity and business efficiency; institutional and business networking development.

Based on the strategy that has been formulated, so the financial perspective consists of sale, return and cost effectiveness, customer perspective consists of competitive price and market share, internal process perspective consists of effective institution, product innovation and employing good quality, growth and learning perspective consists of empowerment, workshop, and training.

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